

CLAIMS

What is claimed is:

1. A laser diode arrangement (10) for generating single mode tunable laser radiation (15) comprising: a laser diode (11) having a rear facet (16) and a front facet (17) and forming a first resonator (R1), a second external resonator (R2) coupled to said first resonator (R1), at least one optical transmission component (30) and at least one wavelength selective optical reflection element (40, 50) arranged in the laser light path (13) emitted from said laser diode (11) for directing part of said laser light (13) into said second external resonator and coupling it back into said first resonator (R1), and means (60) for changing the coupling quality of the first resonator (R1) to the external, second resonator (R2).

2. A laser diode arrangement according to claim 1, wherein said means (60) for changing the coupling quality is disposed at said laser diode (11).

3. A laser diode arrangement according to claim 2, wherein said means for changing the coupling quality comprises an electric connector contact (61) which is disposed on said laser diode (11) and is divided into first and second connector segments (62, 63) to which different control signals can be applied for independently controlling said divided connector segments (62, 63).

4. A laser diode arrangement according to claim 3, wherein said connector contact (61) is divided into said first and second connector segments (62, 63) in a direction normal to a longitudinal axis (A) of said laser diode (11) such that said first connector segment (62) which is disposed adjacent the rear facet (16) of said laser diode (11) has an axial length (L) greater than the axial length (l) of the second connector element (63).

5. A laser diode arrangement according to claim 3, wherein a control device (66) is provided and connected to said first and second connector segments (62, 63) for supplying control currents to said connector segments (62, 63).

6. A laser diode arrangement according to claim 5, wherein the control current supplied by said control device (66) to said first connector element (62) is constant.

7. A laser diode arrangement according to claim 6, wherein the control current supplied to said second connector element (63) is adjustable by said control device depending on the position of the wavelength selective optical reflection elements (40, 50) relative to said laser diode (11).

8. A laser diode arrangement according to claim 6, wherein the control current supplied by said control device (66) to said second connector segment (63) is adjustable by said control device (66) depending on the laser radiation output (15) from the laser diode arrangement (16).

9. A laser diode arrangement according to claim 1, wherein the rear facet (16) of said laser diode (11) is high-reflection coated.

10. A laser diode arrangement according to claim 1, wherein said front facet (17) of said laser diode (11) which faces said external resonator (R2) is provided with an antireflection coating.

11. A laser diode arrangement according to claim 10, wherein the reflectivity of said anti-reflection coated front facet (17) is smaller than 0.001.

12. A laser diode arrangement according to claim 1, wherein said laser diode (11) has an active zone of a rectangular or trapezoidal form.

13. A laser diode arrangement according to claim 1, wherein said transmission component (30) comprises a collimator (32).

14. A laser diode arrangement according to claim 1, wherein said wavelength selective reflection element (40) is an optical diffraction grating.

15. A laser diode arrangement according to claim 1, wherein said wavelength selecting reflection element (50) is a mirror.

16. A laser diode arrangement according to claim 1, wherein said laser diode (11) and said external resonator (R2) form one of a Littman and a Littrow arrangement.

17. A laser diode arrangement according to claim 1, wherein said laser diode (11) is a quantum cascade laser.

18. A laser diode arrangement according to claim 1, wherein the laser radiation (15) is coupled back by way of the rear facet (16) of the laser diode (11), the ratio of the reflectivity of the rear facet (16) to the reflectivity of the optical reflection element (40) being smaller than 1.

19. A laser diode arrangement according to claim 18, wherein said ratio of reflectivity is at most 0.1.

20. A laser diode arrangement according to claim 19, wherein the reflectivity of the optical reflection element (40) is at least 0.95.

21. A laser diode arrangement according to claim 1, wherein said laser diode (11) has an axial length (D) of at least 500 μm .

22. A laser diode arrangement according to claim 18, wherein an optical transmission component (70) is arranged in the area of the rear facet (16).

23. A laser diode arrangement according to claim 1, wherein said transmission component (30) comprises a collimation lens (32) and a diffracting cylinder lens (34) having an axis (2) which extends essentially parallel to the optical reflection elements (40, 50).

24. A laser diode arrangement according to claim 23, wherein the cylinder lens (34) is arranged between the laser diode (11) and the collimation lens (32).

25. A laser diode arrangement according to claim 23, wherein the collimation lens (32) is arranged between the laser diode (11) and the cylinder lens (34).

26. A laser diode arrangement according to claim 1, wherein said optical reflection element (40), which are arranged at an angle of 90° relative to each other.